

Brief Summaries of Fiscal Year 2004 Congressionally Directed and Competitively Awarded COTS Regional Observing System and Related Observing System Support Projects

Congressionally Directed:

1) Alliance for Coastal Technologies (ACT)

Project Name/Title: The Alliance for Coastal Technologies (ACT)

Date Project Initiated: May 1, 2001

Recipient Institution: University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory

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Brief Project Summary: The Alliance for Coastal Technologies (ACT) is a partnership of research institutions, state and regional resource managers, and private-sector companies interested in developing and applying sensor and sensor platform technologies for monitoring coastal systems. ACT serves as 1) an unbiased, third-party testbed for evaluating new and developing coastal sensor and sensor platform technologies, (2) a comprehensive data and information clearinghouse on coastal technologies, and (3) a forum for capacity building through a series of annual workshops and seminars on specific technology topics. Through these activities, ACT aids resource managers, coastal scientists, and private-sector companies by providing critical information on the latest, best, and most innovative and efficient technologies for monitoring and studying coastal waters.

Benefits: ACT provides a mechanism for transitioning newly emerging ocean-observation technologies to operational use rapidly, efficiently, and effectively. As a "technology broker," ACT maintains a continuing dialogue with operational technology users, technology providers, and the research and development community to identify technology needs, find new technologies, and document technology potential. This dialogue is one element of ACT that will help the operational U.S. Integrated Ocean Observing System (IOOS) agencies decide how to fund and manage technology development and link these activities, both in research institutions and the private sector, with IOOS operations. In addition, ACT, working with universities and ocean technology companies to quantitatively evaluate alternative technologies, will provide the IOOS agencies with information needed to deploy a cost-effective system of synergistic observing instruments and platforms, and capitalize on technical advances to continually upgrade its operations.

Accomplishments to Date:

- Established an organizational framework and a governance structure to function as a nationally coordinated, regionally distributed, networked "co-laboratory." Organizational elements of ACT include a headquarters unit at the Chesapeake Biological Laboratory to coordinate all ACT activities, partner research institutions located throughout the country to conduct field and laboratory work and regional outreach activities, a Stakeholder Council, and regional Alliance Members chapters.
- Established mechanisms for sustained stakeholder dialogues to develop consensus on key issues and created a coordinated international network of users and producers of coastal monitoring technologies through the Stakeholder Council, Alliance Members, and issue-focused workshops.
- Created an outreach program to increase awareness of ACT and its activities to a broad audience, which included creating an ACT Web site, exhibits and special events, audiovisual presentations for education and training, and print media, with particular emphasis given to critical high-visibility publications.
- Established the ACT Coastal Observing Technology Clearinghouse, a searchable database available on the ACT Web site, which helps coastal managers and other technology seekers learn about commercially available and new coastal observing technologies.
- Developed, through customer needs surveys and a series of technical workshops, a consensus among resource managers, coastal scientists, and private-sector companies on the state-of-the-art and priority development needs for coastal technologies in a number of areas. These needs include biological sensors for harmful algae and pathogen detection, chemical sensors for measuring nutrients and dissolved oxygen, acoustic imaging technologies for coastal habitat and resources assessment, high frequency radar for oceanographic observations, and biofouling prevention technologies.
- Initiated a verification test of in situ dissolved oxygen sensors for accuracy, reliability, precision, and instrument drift/calibration life. The tests will be conducted from June to August 2004, and verification statements will be released to the public in December 2004. Five instrument manufacturers are participating in the test.

Current Year Objectives:

- Establish mechanisms for strategic planning and program evaluation.
- Sustain stakeholder dialogues through the Stakeholder Council, Alliance Members, and technical workshops.
- Sustain and enhance ongoing activities to disseminate information through Web-based media, including the Web site and the Coastal Observing Technology Clearinghouse.
- Continue to network and collaborate with other technology verification and transfer programs, including collaboration with European institutions in the development of a Euro-ACT.
- Continue technical workshop series on the following topics: underwater imaging systems, acoustic remote sensing, in situ nutrient sensors, autonomous geno-sensors, dissolved carbon dioxide sensors, profiling float, and underwater remote-operated vehicles.
- Conduct technology verification of selected fluorometry technology for in situ measurements of chlorophyll.
- Conduct customer needs and use assessments in support of the verification of fluorometry technology and selected (3–4) technical workshops.

Partners: University of South Florida; Skidaway Institute of Oceanography; Moss Landing Marine Laboratory and Monterey Bay Aquarium Research Institute; Gulf of Maine Ocean Observing System; the School of Ocean and Earth Science and Technology (SOEST), University of Hawai'i; and the Cooperative Institute for Limnology and Ecosystems Research (CILER), University of Michigan. The University of Alaska Fairbanks and the Alaska Sea Life Center will be added to the ACT Partners in May 2005.

2) California Center for Integrative Coastal Ocean Research (CI-CORE)

Project Name/Title: CICORE: Center for Integrated Coastal Observation, Research and Education

Date Project Initiated: August 1, 2002

Recipient Institution: San Jose State University for a California State University Consortium

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Brief Project Summary: CI-CORE is dedicated, through a combined program of research, education, and public outreach, to addressing California coastal regulatory and management issues to ensure sustainable use of the coastal zone. Taking advantage of the statewide distribution of California State University (CSU) campuses, CI-CORE promotes three core technologies to develop a distributed, yet integrated, coastal monitoring observatory focused on the critically impacted region from the 100-meter isobath into, and onto, the shore and estuaries. In situ monitoring at fixed locations provides a statewide observatory of time-varying water quality parameters. High-resolution seafloor bathymetry and habitat mapping and hyperspectral imaging of benthic, shallow water and coastal environments improve resource management in critical coastal and wetlands areas. Besides serving the state needs, CI-CORE is integrated with other observatory programs locally, regionally, and nationally to help satisfy the mandate of the U.S. Integrated and Sustained Ocean Observing System (IOOS) as articulated by Ocean.US and other state and federal programs. This program ensures that California provides national leadership promoting these mandates.

Accomplishments to Date:

- In situ monitoring:
 - Long-term statewide time-series of water quality and meteorology parameters, including
 - temperature, salinity, density, and pressure,
 - optically monitored parameters (fluorescence, sediment load, turbidity),
 - automated monitoring of dissolved nutrients, phytoplankton, and zooplankton,

- meteorology
- Hyperspectral imagery of the nearshore and coast
 - Coastal waters optical properties
 - Bloom detection, including harmful algal blooms (HABs)
 - Nearshore bathymetry
 - Kelp forest coverage and change
 - Wetlands characterization
- High-resolution seafloor bathymetry and habitat maps
 - Baseline bathymetry and bottom characterization including hyperspectral validation
 - Environmental change detection

Current Year Objectives: CI-CORE year-two objectives have concentrated on extending the hyperspectral coverage into estuarine and wetlands areas and implementing more in situ monitoring. All data and derived products are available through the Web sites hosted by each partner. In addition, the program has solicited new members and will continue to expand as funding allows. There are five more CSU campuses that have expressed interest in joining CI-CORE.

Partners:

CSU Campus

California State Polytechnic University, San Luis Obispo
 California State University, Hayward
 California State University, Monterey Bay
 Humboldt State University
 Moss Landing Marine Laboratories
 San Francisco State University/Romberg Tiburon Center
 San Jose State University: coordinating institution

New CSU campuses (1 August 2004)

California State University, Long Beach
 San Diego State University

Other Consortia Members

Florida Environmental Research Institution
 Old Dominion University

Strategic Partners

California Department of Fish and Game
 Central and Northern California Ocean Observing System (CeNCOOS)
 Monterey Bay National Marine Sanctuary
 San Francisco Bay National Estuarine Research Reserve

3) Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)

Project Name/Title: The Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)

Date Project Initiated: June 1, 2002 (grant start date); July 3, 2002 (the financial assistance award received by University of South Carolina from NOAA Grants Management Division)

Recipient Institution: University of South Carolina (USC) Research Foundation; Belle W. Baruch Institute, University of South Carolina, with North Carolina State University

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Project Web Site: http://caro-coops.org/carocoops_website/index.php

Brief Project Summary: The central goal of Caro-COOPS is prediction of coastal ocean processes. The overall objectives are to 1) integrate information on biological, chemical, and physical processes in the Carolinas' coastal ocean to provide a thorough understanding of how physical forcing and biological responses are coupled geographically and temporally; 2) assess the predictability of specific coastal processes and events and use this information to develop accurate forecasting models; and 3) create tools for applying and evaluating these predictions to provide user communities with early-warning systems.

Caro-COOPS is a wholly integrated system for coastal observations and their application to user-driven needs, including 1) an extensive array of instrumented moorings in the South Atlantic Bight off South Carolina; 2) a comprehensive data management system, essential for access to, and integration of, high-quality, real-time data; and 3) an advanced suite of integrated models that will markedly improve predictions made from real-time physical data from coastal ocean instrumentation.

An initial demonstration of the real-time interdisciplinary forecast concept for Caro-COOPS is real-time prediction and analysis of storm surge and flooding before and during landfall of coastal storms. This will improve warnings and provide local officials with the information needed for mitigation, preparedness, and prevention measures. Most recently, Caro-COOPS has also been laying the groundwork to develop a pilot project to incorporate predictions of climate variability and other meteorological and oceanic forcings into the development of tools that support commercial and recreational fisheries and their management.

Benefits: Caro-COOPS will systematically acquire and disseminate via Web interfaces real-time data on coastal ocean conditions in the Carolinas. The program will also develop and deliver regular, comprehensive information products to serve the needs of many user groups, including government agencies, industries, scientists, educators, nongovernmental organizations, and the public. Caro-COOPS will support NOAA and other federal agency missions by providing real-time predictions, and ultimately forecast tools, to mitigate coastal hazards, support management of living resources and marine ecosystems, facilitate safe and efficient marine operations, and support national security efforts. A fully operational Caro-COOPS will reduce the costs and risks to people, the economy, and natural resources from natural and human-induced hazards and increase coastal communities' ability to adapt to changing conditions, resulting in a balance of environmental and economic benefits.

Accomplishments to Date:

- Established a real-time observational network consisting of three cross-isobath lines of stations, including a line beginning at Sunset Beach, North Carolina, and extending into Upper Long Bay, North Carolina; a second line extending from Capers Island above Charleston Harbor, and a third line set north of Hilton Head Island, South Carolina, at Fripp Inlet. Each line includes a National Ocean Service CO-OPS National Water Level Observation Network (NWLON)-compatible shore-based water level (and meteorological) station (WLS) and offshore moorings located on the inner shelf (10 meter isobath) and mid-shelf (30 meter).
- Provided real-time data from the mooring systems, through a Web-based interface, on vector current profiles, water level, sea temperature and salinity at the surface and on the seafloor, and fluorescence near the surface. Data on wave direction and wave energy spectra are collected, but not transmitted in real time. The WLS collect and transmit water-level data, water and air temperature, barometric pressure, relative humidity, and wind speed, direction, and gusts.
- Successfully implemented the use of U.S. Department of Defense (DOD) Iridium Low Earth Orbiting communication satellite system for data transmission from offshore sites.
- Developed computer programs and infrastructure for automated receipt, organization, and delivery of data transmitted by instrumented moorings.
- Developed Web interface and information portal for access to observational data, model predictions, and information products.
- Developed map-based and geographic information system (GIS)-based tools that visualize observational data and model predictions, as well as additional data layers—for example, aerial maps, topographic and bathymetric data, and land use information—for user applications.
- Developed a new technique to model inundation and drying processes of coastal flooding and a state-of-the-art three-dimensional, time-dependent storm surge and inundation and retreat model, and applied the new technique and model to Charleston Harbor.
- In a hindcast analysis, validated the surge and flood inundation model using data from Hurricane Hugo, which struck the Charleston region in 1989.
- Incorporated a new concept for storm surge prediction based on an ensemble approach by perturbing storm tracks and intensity using National Hurricane Center storm forecast guidance, and tested this new ensemble approach during the passage of Hurricane Isabel in 2003.
- Developed a new NOAA WaveWatchIII wave model to Office of Naval Research SWAN model transition, which establishes wave prediction reliability with computation efficiency. This new wave forecast capability was tested during the passage of Hurricane Isabel in 2003.

Current Year Objectives:

1. Ensure that the observing array is reporting data in a reliable and consistent manner.
2. Upgrade observing subsystem by integrating meteorological sensors on all Caro-COOPS moored buoy systems and developing means to reduce the data telemetry time from six to two hours, or possibly one hour.
3. Upgrade the integrated assimilation, management, archival, and distribution system for Caro-COOPS data, metadata, and products, including developing an automated quality assurance and quality control process, improving mechanisms for data delivery from federal backbone providers, and redesigning and streamlining the GIS mapping and analyses capabilities.
4. Validate and enhance the coastal flooding model for Charleston Harbor and develop the models for Hilton Head and Myrtle Beach areas.

5. Develop the user application components of the program, particularly through establishing a coastal flooding prediction tool and planning for the fisheries application component.

Partners: University of South Carolina's Belle W. Baruch Institute, the North Carolina State University (NCSU), the University of North Carolina at Wilmington (UNCW), and the South Carolina Department of Natural Resources (SCDNR).

4) Center for Integrated Marine Technologies (CIMT)

Project Name/Title: Center for Integrated Marine Technologies (CIMT)

Date Project Initiated: July 2002

Recipient Institutions: University of California Santa Cruz (UCSC); Moss Landing Marine Laboratories (MLML); Naval Postgraduate School (NPS); Monterey Bay Aquarium Research Institute (MBARI); Southwest Fisheries Science Center (SWFSC), National Marine Fisheries Service (NMFS); National Oceanic and Atmospheric Administration (NOAA)

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Brief Project Summary: The mission of the Center for Integrated Marine Technologies (CIMT) is to create a coastal ocean monitoring program that links new technologies and data across disciplines of marine science to address key questions for the management and conservation of California coastal marine resources.

Specifically, CIMT is using these technologies to investigate the critical linkages between detailed physical oceanographic measurements of upwelling with assessments of the availability of critical nutrients to determine the extent to which these predict the distribution, abundance, and species composition of phytoplankton and zooplankton, and the distribution, abundance, and species composition of top-level consumers including fish, seabirds, marine mammals, and sea turtles.

This comprehensive interdisciplinary approach will serve as a model for an integrated coastal ocean observing system and establish the scientific basis for the effective monitoring and management of coastal fisheries and protected resources, especially those of the Monterey Bay National Marine Sanctuary.

Accomplishments to Date:

- California Department of Health Services (CDHS) Biotoxins Program receives and uses population abundance and toxin analysis information of toxic algal species from CIMT.
- CIMT has made the California State Crime Lab aware of toxic algal species and has provided them with toxic algal species data and analysis.
- Development of “rapid-response” remote sensing products with Dr. Richard Stumpf (NOAA) for the identification of potential HAB problems in California. Information reported directly to CDHS.
- Partnership of CIMT and Sanctuary Integrated Monitoring Network (SIMoN), Monterey Bay National Marine Sanctuary (MBNMS). CIMT data will be used by the MBNMS staff to inform management decisions.
- Working relationships developed with the Channel Islands, Gulf of the Farallones, and Cordell Banks National Marine Sanctuaries and the Point Reyes Bird Observatory in adapting methodology and equipment to help in future management decisions.
- Direct collaboration with the developing regional Integrated Ocean Observation System (IOOS) the Central and Northern California Ocean Observation System (CeNCOOS).
- CIMT acted as the Regional Data Center for the Central California coast while participating in the NOAA IOOS Interoperability Demonstration to create Web-accessible maps of hourly sea surface temperatures.
- As a direct result of CIMT, researchers now know how variable toxic bloom areas are (where very high populations can be in one area and not in another).
- Instrumentation and support (calibration, interpretation) for the permanent equipment added to the *R/V John Martin* is available to other entities and is now being used, with CIMT support, by the City of Watsonville, California, as part of its monitoring efforts.
- CIMT is providing local support, dissemination, and validation for remote sensing (ocean color) products in collaboration with NOAA (Dr. Richard Stumpf), Pacific Fisheries Environmental Laboratory (PFEL), and the Tagging of Pacific Pelagics (TOPP) program coordinated by Dr. Barbara Block (Stanford). This partnership includes public access to these data, dissemination to resource managers, and outreach activities (including partnership with the Monterey Bay Aquarium).

Current Year Objectives:

- The CIMT Web site, <http://cimt.ucsc.edu>, will undergo construction to better incorporate end-user needs.
- CIMT animation with the intention of being used in an educational setting such as the Seymour Marine Discovery Center.
- A proposal to the Monitoring and Event Response for HABs (MERHAB) program at NOAA is being recommended for funding. This five-year program (Peter Miller, principle investigator, or PI; Raphael Kudela and Mary Silver, Co-PIs—all members of CIMT; Gregg Langlois, CDHS, co-PI) will provide a mechanism for evaluation and integration of new technologies, including volunteer monitoring, molecular tools, and remote sensing, that are being tested as part of CIMT, into the statewide harmful algal bloom (HAB) monitoring program.

Partners: Dr. Gary Griggs, Project Chair, UCSC; Dr. Don Croll, Ship Survey, UCSC; Dr. Raphe Kudela, Remote Sensing and Modeling, UCSC; Dr. Margaret McManus, Database and Visualization, UCSC; Dr. Jeff Paduan, HF Radar, NPS; Dr. Francisco Chavez, Mooring, MBARI; Dr. Steve Lonhart, Outreach, MBNMS; Dr. Ken Bruland, UCSC; Dr. Mary Silver, UCSC; Dr. Dan Costa, UCSC; Dr. Baldo Marinovic, UCSC; Dr. John Vesecky, UCSC; Dr. Chris Edwards,

UCSC; Dr. Leslie Rosenfeld, NPS; Dr. Jim Harvey, MLML; and Dr. Scott Benson, SWFSC, NMFS.

5) Coastal Ocean Observation and Analysis (COOA)

Project Name/Title: Center of Excellence for Coastal Ocean Observation and Analysis (COOA)

Date Project Initiated: August 2002

Recipient Institution: University of New Hampshire (UNH)

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Brief Project Summary: The primary mission of COOA is to develop and implement new methodologies for monitoring coastal marine ecosystems. The goal is to develop the capability to detect, model, and ultimately forecast changes in the Western Gulf of Maine ecosystem. The information generated by COOA will help researchers gain a mechanistic understanding of the factors controlling the coastal ocean and estuarine ecosystem in the region, and thus will play an important role in decisions related to ecosystem-based management. The objective is to establish a complete end-to-end observing system for the region of interest in the Western Gulf of Maine, centered at the mouth of the Piscataqua River and extending north to Casco Bay and south to Stellwagen Bank.

Three main goals:

- To develop and implement new methodologies for monitoring coastal marine ecosystems
- To promote and demonstrate the dissemination and use of coastal ocean observing data and information by diverse users.
- To complement and enhance national and regional expertise in coastal ocean observing.

The system includes three subsystems:

- Data acquisition – A combined effort using remote sensing and in-situ monitoring with an emphasis on developing automated methods amenable to operational use.
- Data management and distribution – WebCOAST is the portal for all COOA data, as well as other data including historical archives and on-going regional monitoring programs.
- Modeling and analysis – A fine-mesh coupled physical–biological model for the region will benefit scientists, resource managers, and teachers and students.

Accomplishments to Date:

- Field sampling efforts have been integrated to collect a comprehensive suite of ecological and environmental data at 16 stations, including 2 GoMOOS buoys, monthly.
- The FleetLink sensor system has been installed on two coastal research vessels, the R/V *Gulf Challenger* and R/V *Tioga*, with fully georeferenced real-time data transmission.
- A time series beginning in 2000 of eight-day averaged sea-surface temperature and chlorophyll satellite observations for the Northeast are available on WebCOAST. The data are from the MODIS sensors.
- The time series of biogeochemical measurements at the Martha's Vineyard Coastal Observatory was augmented with a two-week spatial survey in June 2004 to characterize dynamics of coastal carbonate chemistry.
- A unique flow-through system acquired to measure carbonate chemistry, together with biological and physical properties, is being used to survey pCO₂ in estuarine plumes.
- WebCOAST data services have been augmented to provide seamless access to all COOA data regardless of where the data reside.
- COOA is partnering with others in the region to share data as members of the Gulf of Maine Ocean Data Partnership, which held its first meeting at Woods Hole in April 2004.
- An ecological community index has been created to characterize and monitor seasonal patterns in the plankton community and a paper has been accepted for publication based on this work.
- COOA is partnering with GoMOOS to develop educational materials and train teachers to use observing data. A workshop held at UNH in June was attended by 20 educators.

Current Year Objectives:

- Core variables (including nutrients, temperature, salinity, chlorophyll, zooplankton biomass) measured during the field sampling (cruises) will be served routinely on WebCOAST.
- Primary production estimates for the Gulf of Maine region will be produced and served in near-real time using algorithms developed and validated with field measurements.
- WebCOAST will partner with the Gulf of Maine Council to house and provide a searchable database of Gulf of Maine monitoring programs.
- A chapter for the *Earth Exploration Toolbook*, entitled "When Is Dinner Served? Predicting the Spring Phytoplankton Bloom in the Gulf of Maine," will be published in July.
- Two complete years of the ecological community index will be completed in September, and the data and results furnished to the Northeast Fisheries Science Center.
- A memorandum of understanding will be developed with GoMOOS detailing the respective roles and joint commitment to the establishment of a regional ocean observing system.
- A workshop at UMass-Boston on July 15 will bring together physicists and biologists to develop linkages for collaborative, multidisciplinary modeling efforts for the Gulf of Maine.

Partners: Gulf of Maine Ocean Observing System (GoMOOS), Northeast Fisheries Science Center, Martha's Vineyard Coastal Observatory, Northeast Center for Ocean Science Education Excellence (COSEE), Gulf of Maine Council, Massachusetts Coastal Zone Management, Regional Association for Research on the Gulf of Maine, and the Northeast Consortium.

6) Coastal Ocean Research and Monitoring Program (CORMP)

Project Name/Title: Coastal Ocean Research and Monitoring Program (CORMP)

Date Project Initiated: September 1999

Recipient Institution: University of North Carolina at Wilmington (UNCW)

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Project Web site: www.cormp.org

Brief Project Summary: CORMP is an integrated, regional coastal ocean observing system (RCOOS) program that will operate under the emerging Southeast Coastal Ocean Observing Regional Association of the Integrated Ocean Observing System (IOOS). Managed by the University of North Carolina at Wilmington, CORMP provides sustained observational and research data for the region's oceanographic, marine weather, marine fisheries, and coastal resource management users. Observations in the coastal ocean extending from just north of Cape Lookout to the North Carolina/South Carolina state line are provided by a combination of fixed stations providing high temporal resolution and regular transects and station sampling providing higher spatial resolution, particularly in the fisheries-critical Cape Fear River plume region. Data collected include surface, subsurface, and seafloor physical, marine biological, and fisheries parameters, benthic boundary layer processes, and sediment transport.

Beginning in 2004, oceanographic stations will be converted to real-time, and real-time surface meteorological data will also be collected. CORMP is also a partner in the regional modeling effort to improve coastal storm surge flooding predictions and marine ecological and fisheries models. Significant regional user partnerships include NOAA's National Weather Service and local Forecast Office, the U.S. Marine Corps Base at Camp Lejeune, and local school districts, with emerging partnerships with the State Ports Authority Wilmington, the Military Ocean Terminal at Sunny Point, and the U.S. Coast Guard. Agreements are in place for the evaluation and use of CORMP data and research in the improvement of coastal rip tide prediction, sediment transport and beach renourishment planning, safety at sea, blue crab fisheries management (the state's largest value fishery), and coastal storm surge forecast improvement. CORMP, a member of the Coastal Observation Technology System (COTS), is funded through NOAA's Coastal Services Center.

Accomplishments to Date:

- CORMP has established an agreement with the U.S. Marine Corps at Camp Lejeune for a joint (50:50 cost sharing basis) deployment and operation of a near-coast mooring in Onslow Bay. The mooring, to be procured through NOAA's National Data Buoy Center, will provide the Marine Corps needed data on meteorological and oceanographic conditions during area training operations, as well as fill an observation gap identified by NOAA's National Weather Service in its coastal waters forecast services.

- CORMP has established an agreement with the National Weather Service Weather Forecast Office (WFO) Wilmington for the quality review and use of CORMP's new surface meteorological moorings now being procured. WFO Wilmington will assist in the quality assurance review of the data, and explore the use of these new data in the WFO's coastal and beach rip current warnings, marine forecast, current weather analysis, and NOAA All Hazard Radio broadcast operations for the area.
- The CORMP high-resolution observing array captured the passage of Hurricane Isabel across the region in September 2003, documenting for the first time some of the first direct measures of hurricane impact on the bottom boundary layer at midcontinental shelf locations in the southeastern U.S. Isabel was shown to cause significant loss of benthic microalgal biomass (up to 40 percent) and extensive sea bed and bottom sediment reworking out to 27 miles offshore. Such biomass loss and sediment disturbances adversely affect trophic relationships in the coastal ecosystem by redistributing benthic primary producers and benthic infauna that support commercially and recreationally important fisheries on the shelf. These results are described in greater detail in a CORMP-sponsored manuscript that has been accepted for publication.
- CORMP has established an education and outreach program utilizing the UNCW-developed River Run and Ocean View programs, enabling primary and secondary schoolteachers to use CORMP. Up to 200 teachers, 100 pre-service teachers, and 500 students are expected to make use of this new outreach service this fall. The Oceanview and Riverview Web sites are at www.uncw.edu/oceanview and www.uncw.edu/riverview/ respectively.
- Assessing temporal and spatial patterns of larval abundance is critical to understanding population dynamics of marine species but is often impossible because of difficulties in identifying planktonic larvae to the species level. Through a partnership with North Carolina Sea Grant, CORMP has developed an efficient multiplex Polymerase Chain Reaction (PCR) assay (a standard technique for making billions of copies of a particular bit of DNA) that can accurately identify (and distinguish) blue crab (*Callinectes* spp.) larvae. This assay is being implemented as part of the CORMP fisheries program in an effort to better understand recruitment variation of the commercially important *C. sapidus*. CORMP has also developed a PCR/RFLP (Restriction Fragment Length Polymorphism) assay that will be used to distinguish three sympatric species of kingfish (*Menticirrhus* spp.) larvae. (RFLP refers to a technique of cutting up DNA. Enzymes specific to a particular sequence of DNA will cut DNA any time that sequence occurs. For example, the enzyme RSA I cuts DNA every time it finds the sequence GTAC.)
- Work supported by both the North Carolina Division of Marine Fisheries (DMF) and CORMP has confirmed the likely importance of the Cape Fear River plume as an important habitat for blue crabs, North Carolina's highest value commercial fishery. DMF is incorporating the new data and findings into the state's management models, and these findings have been used in the recent revision of the division's North Carolina Blue Crab Management Plan.
- Data from CORMP observations of infaunal biomass and benthic microalgal biomass have been provided to the ECOPATH modeling effort sponsored by the South Atlantic Fisheries Management Council. This modeling effort is intended to predict fisheries yields and sustainable fishing levels in the South Atlantic Bight.
- CORMP data are now being provided to the North Carolina Division of Marine Fisheries for use in the state's Coastal Habitat Protection Plans for soft-bottom communities. CORMP now comprises the principal source of benthic primary producer data for this effort. Habitat protection plans are important for use in evaluating proposed dredge material disposal, mineral extraction activities, and seabed construction activities by the

North Carolina Division of Coastal Management, the EPA, the Army Corps of Engineers, the National Marine Fisheries Service, and the Minerals Management Service.

- In response to an unsolicited request by the Nature Conservancy, CORMP data in the Cape Fear River Plume area were delivered for use in the conservancy's national initiative to identify critical offshore and coastal habitats that are to be targeted for habitat conservation and focused management efforts. The conservancy noted that CORMP's scientific-quality, high-resolution data were indispensable in their work.
- CORMP is now working with the North Carolina State Veterinarian's Office, which is investigating coastal impacts of ocean dumping of animal carcasses in the event of mass mortalities from natural disaster or agro-terrorism. This work is sponsored by the U.S. Departments of Agriculture and Homeland Security. At issue are nutrient and pathogen loading to coastal ocean ecosystems, flow patterns and dispersal of materials, and decomposition rates and effects in different oceanic disposal scenarios.

Current Year (2004) Objectives:

- Successfully establish series of real-time moorings with subsurface and surface instrumentation in Raleigh, Onslow, and Long Bays.
- Instrument two commercial fishing piers with subsurface and surface sensors that will provide detailed data on wave spectra and water conditions along the beach.
- Transition the Cape Fear River Estuarine (CFRE) modeling system from a research model into a provisionally operational quality model that can be used by emergency managers for better storm surge predictions.
- Begin development of a water quality model for the Cape Fear River Estuarine (CFRE) system that will be used by fisheries managers, beach renourishment managers, and local public health officials.
- Provide operationally useful information, based on defined research needs, on the state of living marine resources.
- Implement CORMP data management system in cooperation with Caro-COOPS and SEA-COOS.
- Expand vigorous outreach and educational program to include K-12 teachers, fisheries managers, port and military facilities, and homeland security managers.

Partners:

- Caro-COOPS of the University of South Carolina (Dr. Madilyn Fletcher)
- Sea-COOS Associate Member
- North Carolina State University (Dr. Lian Xie and Dr. Len Peitrafesa)
- National Weather Service and the Wilmington Weather Forecast Office
- U.S. Marine Corps Base at Camp Lejeune
- Dr. George Voulgaris and Dr. Dennis Allen, University of South Carolina

7) Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program

Project Name/Title: Gulf of Alaska Ecosystem Monitoring (GEM) and Research Program

Date Project Initiated: October 1, 2003

Recipient Institution: Alaska Department of Fish and Game for the Exxon Valdez Oil Spill Trustee Council

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Project Web Site: www.evostc.state.ak.us/gem/index.html

Brief Project Summary: GEM is a long-term marine observing system dedicated to understanding the marine ecosystems of species and other natural resources injured by the *Exxon Valdez* oil spill. GEM monitors basic biological and physical variables that can be used to explain changes in populations of birds, fish, and mammals that are essential to the economic well-being of Alaskan communities in the region and that are central to the missions of state and federal resource management agencies. To meet the responsibilities of the Exxon Valdez Oil Spill Trustee Council, monitoring is directed toward understanding the long-term fate and effects of oil and its impacts on injured resources and their ecosystems.

GEM monitoring stations are chosen through research selected by an open competitive contracting process. Research is organized around four principal habitat types of the northern Gulf of Alaska, the nearshore, watersheds, Alaska coastal current, and offshore, and it is guided by a central hypothesis on how climate and other physical factors influence geochemical and biological processes to bring about changes in populations of birds, fish, and mammals. Although fiscal year 2004 is GEM's first full year of operation, it has been in planning and research since 1999. GEM's science plan and the peer review of GEM's first research plan by the National Research Council are available on the Web site. GEM is currently a mixture of operational, preoperational, and research projects.

Accomplishments to Date:

Operational Projects

- Continuous plankton recorder (CPR) on vessel of opportunity covering inland, continental shelf, and oceanic waters of the Gulf of Alaska.
- Thermosalinograph (surface) on vessel of opportunity covering inland, continental shelf, and oceanic waters of the Gulf of Alaska.
- Mooring measuring temperature and salinity at depth and surface and fluorescence at surface at site of second oldest continuously occupied oceanographic station in the North Pacific (GAK 1, University of Alaska Fairbanks).
- Thermosalinograph on coastal fisheries research trawl vessel to provide synoptic view of biological and physical conditions on long-standing historical fisheries surveys.

Preoperational Projects

- Implemented preoperational project applying physical oceanographic measurements of currents to design of regulations for salmon fishery operating in area of North America's second highest tidal height variation.
- Implemented preoperational instrument package on ferry operating over continental shelf and inland waters (surface measures of temperature, salinity, optics, nitrate).

Research Projects

- Implemented research project to define monitoring protocols for stable isotopes of nitrogen, carbon, and sulfur to identify the extent and magnitude of marine inputs of carbon and nutrients to coastal watersheds.
- Implemented research on identifying and measuring hydrocarbons in the marine environment preparatory to establishing long-term monitoring stations.
- Implemented research on establishing and measuring exposure of nearshore animals (mussels, clams, ducks, otters) to *Exxon Valdez* oil preparatory to establishing long-term monitoring stations.
- Implemented research survey of nearshore biodiversity utilizing Census of Marine Life NaGISA protocols in preparation for establishing long-term monitoring stations.

Current Year Objectives:

- Participate in establishing long-term administration and governance for regional observing system with Alaskan Ocean Observing System (AOOS).
- Maintain operational observing projects in Alaska coastal current and nearshore.
- Initiate research on biophysical model of northern Gulf of Alaska.
- Continue research for nearshore monitoring of hydrocarbons and biological species and start move into preoperational phase scheduled for fiscal year 2007
- Continue development of preoperational fisheries oceanography project on regulation of salmon fishery.
- Continue research on protocols for establishing marine–terrestrial linkages for coastal watersheds.

Partners: NOAA (National Marine Fisheries, National Ocean Service–Kachemak Bay National Estuarine Research Reserve, Pacific Marine Environmental Laboratory), Department of the Interior (U.S. Geological Survey, U.S. Fish and Wildlife Service), Alaska Department of Fish and Game, University of Alaska Fairbanks, North Pacific Research Board, Oil Spill Recovery Institute, Prince William Sound Science Center, Prince William Sound Regional Citizens Advisory Council, Prince William Sound Regional Citizens Advisory Council.

8) Wallops Ocean Observation Project

Project Name/Title: Research and Development of a Coastal Ocean Observation Sensor Platform: Ocean-Atmosphere Sensor Integration System (OASIS)

Date Project Initiated: September 1, 2003

Recipient Institution: Virginia's Center for Innovative Technology

Primary Contact:

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Project Web site: www.coastalobs.us (under construction)

Brief Project Summary: The primary focus of the project is to establish an ocean observing system along the coastal ocean regions of Virginia, Maryland, and Delaware. A second focus is to establish this system so that it can be used by NASA scientists to develop and test new sensors, platforms, and applications to support NASA and NOAA coastal ocean remote sensing activities and products. The project is focusing on several developments, including developing, testing, and deploying a solar-powered surface autonomous vehicle (Ocean-Atmosphere Sensor Integration System, or OASIS) that is being commercialized with support from NASA's SBIR program. The project is presently developing software for command and control of multiple OASIS platforms to support real-time dynamic mapping capabilities. In conjunction with this, the project is developing a multispectral in situ fluorometer that will be incorporated with the OASIS platform to support HAB (harmful algal bloom) detection research and development efforts. Finally, the project is working to deploy a suite of three long-range coastal surface current radars (CODARs) that will provide real-time surface currents offshore out to 250 kilometers and along the coasts of Virginia, Maryland, and Delaware.

Accomplishments to Date:

- Completion of OASIS platform design that exceeds design specifications and with a reasonable (less than \$20,000 to \$30,000) manufacturing cost estimate.
- Completion of guidance, navigation, and control testing software
- Collaborated with NASA Goddard Space Flight Center's Autonomous Sensor Fleet software group to create an application for multiple platform command and control for dynamic mapping applications.
- Completion of design for the multispectral in situ fluorometer with EG&G and Luna Innovations.
- Identified locations for CODAR radar units.

Current Year Objectives:

1. Complete development, fabrication, and testing of OASIS prototype platform, including testing of guidance, navigation, and control firmware for autonomous surface mapping.
2. Complete development and testing of the spectrometer-based, fluorescence sensing system under development by Luna Innovations and EG&G.
3. Complete field testing of the OASIS platform to determine its capabilities under actual open-ocean situations.
4. Deploy the suite of three CODAR units along the three-state coastal region.
5. Develop an OpenDAP data archive system for the CODAR and OASIS data sets to allow for open community access to all data sets, as recommended by Ocean.US.

Partners: NASA, Old Dominion University, Donald L. Blount & Associates, DLBA Robotics, Luna Innovations, Oceana Sensor Technologies, Emergent Technologies, EG&G Services, Pacific Gyre, and Noesis Inc.

9) Wave Current Surge Information System (WAVCIS)

Project Name/Title: Support and Development of Real Time Ocean Observing Systems off Louisiana Coast: Wave Current Surge Information System (WAVCIS)

Date Project Initiated: July 1, 2001

Recipient Institution: Louisiana State University

Primary Contact:

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Project Web Site: www.wavcis.lsu.edu

Brief Project Summary: The objective of WAVCIS is to provide wave information (sea state), including wave height, period, direction of propagation, water level, surge, near surface current speed and direction, and climatological conditions (wind speed and direction, barometric pressure, air temperature), on a real-time basis for the entire Louisiana coast. The program is designed to provide critical information offshore during hurricanes and offshore accidents. The information is archived or used in real time for many hydrodynamic modeling applications dealing with process-linked studies on coastal erosion and model skill assessment between output and field measurement.

Accomplishments to Date:

- Successful deployment of prototype station off Mississippi coast.
- Successful refinement of connectivity using satellite communications.
- Deployment and maintenance of six stations off Louisiana coast.
- Development of advanced software for comprehensive wave and current analysis.
- Development of new databases for streamlining archival retrieval.
- Development of protocols for data standardization.
- Sharing of data with National Data Buoy Center program.
- Development of work bench for numerical model skill assessment.

Current Year Objectives:

- Continued refinement of interactive geographic information system (GIS).
- Continued refinement of model skill assessment work bench.
- Continued refinement of integration with the National Data Buoy Center.
- Installation of additional stations.
- Continued efforts to integrate WAVCIS with Integrated Ocean Observing System and Gulf of Mexico observatories.

Partners: Minerals Management Service, Office of Naval Research, Naval Research Laboratory, Louisiana Department of Natural Resources.

10) Coastal Ocean Monitoring and Prediction System (COMPS)

Project Name/Title: Enhancements to the Coastal Ocean Monitoring and Prediction System for West Florida: A Component of the Integrated Ocean Observing System

Date Project Initiated: August 1, 2004

Recipient Institution: University of South Florida (USF)

Primary Contact:

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Project Web Site: <http://comps.marine.usf.edu>

Brief Project Summary: Under this project, new elements will be added to the USF Coastal Ocean Monitoring and Prediction System (COMPS) observing array to complement existing USF and NOAA assets in the coastal ocean of West Florida. New coastal and offshore stations with meteorological and oceanographic sensors, a new coastal ocean surface current radar site, a directional wave buoy, and an autonomous glider will be added to the COMPS observational suite to fill critical voids and extend coverage of the observing system. All COMPS water-level observations will be brought up to National Ocean Service (NOS) standards to permit integration of these water level measurements into the National Water Level Program (NWLP), the national backbone program operated by the NOS Center for Operational Oceanographic Products and Services (CO-OPS).

Accomplishments to Date: This project has not yet begun. COMPS has been operational since 1998 and has provided real-time data for numerous coastal marine applications. The Tampa Bay Physical Oceanographic Real-Time System (TB-PORTS) has been operational since 1992 and is a component of COMPS. TB-PORTS provides real-time information for safe and efficient maritime transportation and for environmental protection.

Current Year Objectives:

- Establish additional oceanographic and meteorological observing systems at critical locations along the West Florida coast to augment and enhance the existing observing array on the West Florida Shelf, including the following:
 - Additional water-level, meteorological, and oceanographic observing sites at Cape Romano, Boca Ciega Bay, Booker Creek, and Keaton Beach.
 - An Ocean-Atmosphere flux observing buoy off Panama City at the shelf break/head of Desoto Canyon.
 - A nearshore Ocean-Atmosphere flux observing site off Longboat Key with waves.
 - A Long-Range CODAR surface current radar site at Cedar Key to extend the existing array northward.

- A WaveRider directional wave buoy to be deployed off Pinellas County to provide wave measurements to compare with wave estimates from the CODAR array.
- A Webb glider to augment observations of water column temperature and salinity at fixed sites and from the free-drifting Bottom Stationed Ocean Profilers (BSOPs).
- Four additional BSOPs to augment the existing fleet of 10 BSOPs to provide distributed profiles of temperature and salinity.
- Acquire adequate spares for existing and new buoy and coastal stations.
- Upgrade the operational status of the USF water-level station network to ensure the data meet NWLP standards for operation, data dissemination, and vertical control.
- Complete the integration of data collection, processing, quality control, and dissemination of water level and other observations taken by COMPS with the NWLP and the National Data Buoy Center data systems.

Partners:

- NOAA National Ocean Service Center for Operational Oceanographic Products and Services
- NOAA National Data Buoy Center
- U.S. Coast Guard
- U.S. Geological Survey
- Florida Fish and Wildlife Conservation Commission/Florida Marine Research Institute
- Florida Department of Environmental Protection
- Florida Institute of Oceanography
- Pinellas County
- Tampa Port Authority
- Pasco County Office of Emergency Preparedness
- Citrus County Office of Emergency Management
- The Pier Aquarium
- Campbell Park Elementary School

11) Southern California Coastal Ocean Observing System (SC-COOS)

Project Name/Title: Southern California Coastal Ocean Observing System (SCCOOS): Shelf to Shoreline Observatory Development

Date Project Initiated: Anticipate a June 1, 2004, start date

Recipient Institution: Funds will be directed to the Joint Institute for Marine Observations (JIMO) at Scripps Institution of Oceanography; JIMO will then allocate funding to all sub-awardees.

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Project Web Site: sccoos.ucsd.edu

Brief Project Summary: The Southern California Coastal Ocean Observing System (SCCOOS) is a consortium that extends from Northern Baja California in Mexico to Morro Bay at the southern edge of central California. The consortium aims to streamline, coordinate, and further develop individual institutional efforts by creating an integrated, multidisciplinary coastal observatory in the Bight of Southern California to provide data and information primarily for the benefit of society. Sound scientific approaches will be used in the development of SCCOOS to enable the effective translation of observations to users. By leveraging existing infrastructure, partnerships, and private, local, state, and federal resources, SCCOOS plans to develop an operational coastal observing system to address issues in coastal water quality, marine life resources, and coastal hazards for end user communities spanning local, state, and federal governments and the public. This system will provide water-quality and natural resource managers, scientists, and policy makers with the scientific bases for evaluating the effectiveness of management strategies and designing new approaches, and will also serve as a risk management and early warning tool.

Accomplishments to Date: The coming fiscal year will mark the first year of funding for SCCOOS.

Current Year Objectives: Launch the pilot Southern California Coastal Ocean Observing System and begin integrating and distributing existing observations in the Southern California Bight (SCB), adding new observations, and developing and distributing data syntheses. The pilot-SCCOOS will be tailored to consolidate information from federal, state, and local sources to form an integrated system with an output tuned to managers at all governmental levels. The project will develop methods to (a) find optimal sensor networking schemes, (b) increase the flow of data to allow efficient, adaptive on-sight sampling, (c) create real-time information products by merging data and real-time analyses, (d) distribute data products to disparate end-users, and (e) initiate K-12 education and outreach programs.

SCCOOS will also, as part of a separately funded NOAA project, begin to gather detailed definitions of users and needs, synthesize these needs to determine which regions can be effectively addressed in SCCOOS and under which timeframe, and finalize development of a flexible organizational structure that allows for the delivery of products to and receipt of resources from local, state, and federal agencies. SCCOOS has also submitted a proposal to California state government for \$11 million to install a complete coastal ocean current monitoring system in the bight, relying primarily upon high-frequency radar. This proposal will likely be funded at the end of the summer.

Partners: California Polytechnic University, San Luis Obispo; California State University, Los Angeles; Centro de Investigacion Cientifica y de Educacion Superior de Ensenada; Jet Propulsion Laboratory, National Aeronautics and Space Administration; Scripps Institution of Oceanography, University of California, San Diego; Universidad Autonoma de Baja California; University of California, Santa Barbara; University of California, Irvine; University of California, Los Angeles; University of Southern California; Southern California Coastal Water Research Project.

12) Gulf of Maine Ocean Observing System (GoMOOS)

Project Name/Title: The Gulf of Maine Ocean Observing System (GoMOOS): A Regional Pilot of the Integrated Ocean Observing System

Date Project Initiated: Will begin receiving NOAA funding in July 2004

Recipient Institution: Gulf of Maine Ocean Observing System

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Project Web Site: www.gomoos.org

Brief Project Summary: This project will sustain and enhance the four elements of the Gulf of Maine Ocean Observing System that was initiated in 2000: 1) the organizational structure designed to meet the needs of multiple users, 2) an observing system that operates around the clock with real-time data delivery, 3) a data management system that distributes data on a free and open basis, and 4) an analysis and product subsystem that creates information in a variety of forms, from the simple intuitive display to sophisticated model products. In the coming year, GoMOOS will 1) enhance user involvement by targeting fisheries managers, coastal zone managers, the Coast Guard, and researchers, 2) enhance forecasting and warning capabilities, and 3) launch a nearshore buoy program aimed at meeting the needs of coastal and water quality managers. GoMOOS will accomplish this by sustaining the existing observing and data management systems, building partnerships for the exchange of data in the region and with federal agencies, and the continuing the development of data products to meet user needs. GoMOOS will seek the advice of the Science Advisory Committee for ways in which the system can use technology to better meet the needs of users.

Accomplishments to Date:

- Sustained operations of the system.
- Meeting of Science Advisory Committee set for October 2004.
- Meeting of optical experts in the region to review GoMOOS optical program set for August 2004.

Current Year Objectives:

- Continue to provide reliable measurements on the Gulf of Maine.
- Initiate the nearshore buoy program for meeting needs of coastal managers.
- Continue to ensure data interoperability with federal and regional partners through the Gulf of Maine Ocean Data Partnership.
- Develop data products that assist fishermen and fishery managers to integrate different data sets to help them solve problems and understand their fishery.
- Form partnership with regional entities to support educational and outreach activities.

Partners:

- University of Maine
- Bigelow Laboratory for Ocean Sciences
- Woods Holes Oceanographic Institution
- Bedford Institute for Oceanography
- University of New Hampshire

13) Long Island Sound Integrated Coastal Observing System (LISICOS)

Project Name/Title: The Long Island Sound Integrated Coastal Observing System (LISICOS)

Date Project Initiated: September 1, 2003

Recipient Institution: University of Connecticut

Primary Contact:

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Brief Project Summary: With more than eight million people living in its watershed, Long Island Sound (LIS) is the nation's preeminent urban estuary. LIS provides the region with natural resources, including oysters, clams, lobsters, and bluefish, and both commercial and sport fishing are important to the regional economy. Unfortunately, LIS has also served as the region's sewer, resulting in water quality degradation and critical habitat loss. Extensive wastewater treatment plant upgrades have been mandated to rectify these problems. The high concentration of development along the surrounding coastline has also prompted increased dredging for navigation, electric power transmission, and gas pipelines. The goal of the Long Island Sound Integrated Coastal Observing System is the development of a sustained capability to observe the Long Island Sound ecosystem and an adequate capability to understand and predict its response to natural and anthropogenic changes.

Accomplishments to Date:

- Deployment and maintenance of five buoys that monitor salinity, temperature, and dissolved oxygen throughout the sound.
- Three of the above buoys provide over-water meteorological observations. One includes a surface wave sensor, and one includes PAR and chlorophyll sensors.
- Development of a three-dimensional circulation model.
- Development and testing of a primary-production respiration model.
- Coupling of the circulation and ecosystem models.
- Analysis of existing hydrography to infer exchange between LIS, the Hudson River, and the shelf waters

Current Year Objectives:

- Quantify horizontal and vertical transport of water, carbon, nitrogen, and oxygen in the western sound.
- Determine the relative contribution of local primary production (autochthonous) and input of allochthonous matter to the organic fluxes.
- Measure the spatial and temporal variation of primary production and its fate (fraction respired, grazed, vertically sunk, horizontally advected, etc.).
- Measure the spatial and temporal variation in the benthic oxygen demand in western LIS.
- Synthesize the observations and develop a model that can be used to predict the evolution of oxygen concentrations in response to management options.
- Measure and track changes in composition and function of plankton and benthos, including benthic recruitment dynamics.

Partners:

- National Undersea Research Program
- Sea Grant College Program
- Connecticut Department of Environmental Protection
- Norwalk Aquarium
- U.S. Environmental Protection Agency – Long Island Sound Office
- Connecticut Audubon

14) Southeastern Universities Research Association (SURA) Coastal Ocean Observing and Prediction (SCOOP) Program

Project Name/Title:

Date Project Initiated: September 2004

Recipient Institution: Southeastern Universities Research Association

Primary Contact:

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Project Web sites: www.sura.org (click on SCOOP for overview)
 <http://twiki.sura.org> (for project status)
 www.openioos.org (for some project deliverables)

Brief Project Summary: In the coming year, the SCOOP program will implement key elements of a distributed system for assessing and predicting environmental response to extreme events in the eastern U.S. coastal zone, from Canada to Mexico. The program will focus on storm surge, wind waves, and surface currents, with special attention on predicting and visualizing phenomena that cause damage and inundation of coastal regions during severe storms and hurricanes. Partners

include university researchers and relevant NOAA, Navy, and other federal agency program offices. The agency partnerships will facilitate the transition of well-tested research capabilities to an improved operational prediction system.

SCOOP is emphasizing the transition of “pre-operational” research activities to activities that are operational. This approach, which is the signature of SCOOP, is referred to as “interoperability” and is intended to help bridge the historical gap between research and operations. Each type of activity has its own set of goals and anticipated outcomes. It is the SCOOP mission to create an effective link between them. Thus, SCOOP will bring together science leaders from the research community with operational leaders and user groups to develop and implement specific objectives for numerical modeling, real-time data exchange, and continuous operational prediction and visualization.

Accomplishments to Date: SCOOP funding began in September 2004. Extensive project planning has taken place, and some of the first deliverables will appear in October of this year.

Current Year Objectives: It is intended that these three activities will merge into a seamlessly integrated system.

- A data-standards development process;
- A “data grid” demonstration of interoperability at the data level based on Open GIS Consortium (OGC) standards for Web services; and
- A “model grid” demonstration of coupled storm-surge and wind-wave prediction models that employ “grid” technologies based on standards from the Open Grid Services Architecture (OGSA).

Partners: Texas A&M, University of Alabama at Huntsville, University of Miami, Virginia Institute of Marine Science, Louisiana State University, Gulf of Maine Ocean Observing System, University of North Carolina, University of Florida, University of Delaware, Southeast Atlantic Coastal Ocean Observing System.

Competitively Awarded:

Regional Coordination

1) Alaska Ocean Observing System

Project Name/Title: Alaska Ocean Observing System

Date Project Initiated: October 2003

Recipient Institution: Alaska Ocean Observing System at the Alaska SeaLife Center

Primary Contact:

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Project Web Site: www.aoos.org

Brief Project Summary: The Alaska Ocean Observing System (AOOS) is part of a growing national network of integrated ocean observing systems that will improve the ability to rapidly detect changes in marine ecosystems and living resources, and predict future changes and their consequences for the public good. When fully developed, AOOS will

- Serve as the Alaska regional node for a national network of observing systems;
- Systematically deliver both real-time information and long-term trends about Alaska's ocean conditions and marine life;
- Provide to the public Internet access to cost-free data and information on coastal conditions; and
- Supply tailored products to meet the needs of mariners, scientists, industry, resource managers, educators, and other users of marine resources.

Accomplishments to Date:

- Hired a director, established an office, created Web site, began to create an organizational infrastructure for program consistent with regional association criteria under development by Ocean.US.
- Held Data Management and Communications (DMAC) workshop, established DMAC committee, drafted terms of reference, and began drafting pilot effort for Prince William Sound.
- Partnerships in place as evidenced by signed memorandum of agreement and funding commitments for two years of planning and pilot efforts.
- Held two Governance Committee meetings.
- Facilitated development of straw man AOOS implementation strategy for three regions in Alaska—Arctic, Bering Sea, and Gulf of Alaska—with more detailed strategy for Bering Sea region and Prince William Sound subregion.
- Actively participated in meetings and workshops to develop regional association criteria and National Federation of Regional Associations (NFRA).

- Widely promoted AOOS and potential benefits to variety of stakeholder groups and individuals, and in turn assessed needs of users for such a system.

Current Year Objectives:

- Determine governance structure that makes sense for Alaska and meets Ocean.US criteria.
- Organize stakeholder user needs assessments, planning workshops geared towards developing final product of strategic operational plans for the three regions: Arctic, Bering Sea/Aleutian Islands, and Gulf of Alaska.
- Develop statewide-integrated data system that conforms to national criteria and protocols.
- Obtain certification as the regional association for Alaska.
- Participate in national efforts, including the national DMAC committee and the National Federation of Regional Associations.
- Develop pilot projects.
- Integrate existing observing systems. Plan for and implement expanded, integrated systems for all three regions.

Partners: University of Alaska, North Pacific Research Board, Exxon Valdez Oil Spill Trustee Council, Alaska SeaLife Center, Prince William Sound Science Center, Barrow Arctic Science Consortium, NOAA, Minerals Management Service, U.S. Geological Survey, Alaska Sea Grant, National Weather Service.

2) Central and Northern California Ocean Observing System (CeNCOOS)

Project Name/Title: Central and Northern California Ocean Observing System (CeNCOOS): Leadership in Coordination of Ocean Observing

Date Project Initiated: October 1, 2003

Recipient Institution: Monterey Bay Aquarium Research Institution (MBARI)

Primary Contact:

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Project Web Site: www.cencoos.org

Brief Project Summary: The Monterey Bay Aquarium Research Institute received, on behalf of the Monterey Bay Crescent Ocean Research Consortium (MBCORC) and proposal partners, \$100,000 for the first year to initiate and support focused regional coordination of ocean observing activities in central and northern California. This effort, the Central and Northern California Ocean Observing System (CeNCOOS), will strategically enhance the organization, implementation, and application of existing and planned regional coastal observing system efforts

along the California coast. In addition to the membership of MBCORC, the CeNCOOS partners extend north to Arcata and south to San Luis Obispo, across 625 miles of California coastline. The CeNCOOS effort will also initiate interaction and coordination with other coastal observing efforts (e.g., the Southern California Coastal Ocean Observing System and the Northwest Association of Networked Ocean Observing System). Our coordinating effort is designed to be multiyear but with the understanding that at this time only the first year of funding was made available.

Accomplishments to Date:

- Hired a full-time coordinator.
- Established an interim Executive Committee.
- Began to expand stakeholder base through site visits, presentations, and participation in meetings.
- Established committees on governance, end users, science, and data management.
- Designed and populated a geodatabase to track observing activities in the region and to plan for their coordination.
- Prepared the first iteration of a summary paper on observing systems in the region.
- Prepared a proposal to the State of California to initiate a Coastal Ocean Currents Monitoring Program (including high-frequency radar, associated technologies, and models) in central and northern California.
- Participated in Ocean.US teleconferences and meetings, as well as the meetings of neighboring regional associations and the Organizing Committee of the National Federation of Regional Associations.
- Responded to Ocean.US request for a status report and priorities through 2011.
- Identified three possible governance models for our regional association.
- Designed and published the Web page, www.cencoos.org.

Current Year Objectives:

- Prepare a summary paper on observing systems in the region.
- Meet with stakeholders in the region.
- Establish subcommittees to address important aspects, such as technology and operations, data management, science, end users, etc.
- Discuss with Ocean.US how the CeNCOOS regional system can best connect with the national backbone.
- Produce a long-term organizational plan for CeNCOOS, including the identification of a governance model.
- Prepare an integrated CeNCOOS strategic plan for many observing efforts planned and under way.

Partners: California State University, Monterey Bay; California Polytechnic State University San Luis Obispo; Earth System Science and Policy Institute, Elkhorn Slough National Estuarine Research Reserve; Fleet Numerical Meteorology and Oceanography Center; Hopkins Marine Station of Stanford University; Humboldt State University; the California Department of Fish and Game's Marine Pollution Studies Laboratory, Marine Region Headquarters, and Marine Wildlife Veterinary Care and Research Center; Marine Protected Areas Center, Science Institute, NOAA; Monterey Bay Aquarium; Monterey Bay Aquarium Research Institute; Monterey Institute of International Studies; Monterey Peninsula College, Marine Advanced Technology Education Center; Moss Landing Marine Lab; National Weather Service; Naval Postgraduate School; Naval Research Lab, Marine Meteorology Division; Monterey Bay National Marine Sanctuary; NOAA/NMFS Pacific Fisheries Environmental Lab; NOAA/NMFS Santa Cruz Lab; Romberg

Tiburon Center for Environmental Studies, San Francisco State University; San Francisco State University; University of California (UC), Monterey Bay, Education, Science, and Technology Center; UC Davis, Bodega Marine Lab; UC Santa Cruz; UC Santa Cruz, Institute of Marine Sciences/Long Marine Lab; UC Sea Grant Extension Program; U.S. Geological Survey, Pacific Science Center; and West Coastal and Polar Regions Undersea Research Center, NOAA

3) Gulf of Mexico Coastal Ocean Observing System

Project Name/Title: Development of the Regional Association for the Gulf of Mexico Coastal Ocean Observing System

Date Project Initiated: October 1 2003

Recipient Institution: Texas A&M University via the Texas A&M Research Foundation

Primary Contact:

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Project Web Site: www.gcoos.org

Brief Project Summary: Our overall objective is to develop a regional association for the management of a Gulf of Mexico Coastal Ocean Observing System (GCOOS) as a contribution to the U.S. Integrated Ocean Observing System (IOOS). The effort will include development of linkages with coastal observing programs of other nations in the Gulf. This section reviews briefly the status of development of GCOOS. It is being developed on the principles of the Global Ocean Observing System (GOOS) as stated in IOC (1998) and those of the IOOS as given in the U.S. IOOS Phased Implementation Plan.

Accomplishments to Date:

Organization of meetings

- Organized an IOOS-Industry meeting held 2-4 March 2004 at Marathon Oil Company in Houston Texas to explore private sector interests and roles in the U.S. Integrated Ocean Observing System with a focus on the regional observing systems of the Gulf of Mexico and southeastern U.S. Ninety-six attended, of whom 64 were from private sectors involved in marine activities. The workshop was judged to be highly successful by the attendees. Details of the meeting, including all presentations, are available via the GCOOS web site.
- Worth Nowlin served on the steering committee for and attended a HABSOS-GCOOS workshop held 13-14 April 2004 in St. Petersburg, FL. Mark Luther and Charlie Colgan also attended.

- Seven key GCOOS planners met in Stennis, MS on 13 May examine inputs from the GCOOS stakeholders regarding highest priorities for the enhancements/additions to the national backbone and GCOOS for the Gulf of Mexico.
- Worth Nowlin served on the organizing committee for the "Next Steps" workshop held on 7-8 July 2004 at the Bush Presidential Conference Center. The objective was to set a research agenda for the Gulf in response to the *Preliminary Report of the U.S. Commission on Ocean Policy*. Commissioners participated. Nowlin gave a presentation on GCOOS Development
- The key players identified in the proposal have commenced planning for the first all Gulf stakeholders meeting to ratify interim governance structure and begin work toward a business plan

Attendance at meetings

- Robert Martin attended the ninth meeting of the U.S. GOOS Steering Committee on 12-14 November 2003 in St. Petersburg, FL as the representative of GCOOS. He made a presentation on the status of the observing system.
- Luis Cifuentes (Texas A&M University) attended as the GCOOS representative the Education Planning Workshop on 22-24 March 2004 in Charleston, SC.
- Worth Nowlin, Robert Martin Mark Luther (University of South Florida) and Landry Bernard attended as GCOOS representatives the second national summit of regional associations held 29-30 March 2004 in Washington, D.C.
- Frank Muller-Karger attended as GCOOS representative the Workshop/Symposium on coastal ecosystems of the Gulf of Mexico: Toward the integration of research groups, June 30 - July 3; Veracruz, Mexico

Other development activities

- Information regarding the nature and costs of Gulf observing system elements, including desired improvements, sources of support and estimated costs through FY2011, was assembled by Nowlin; and a first Gulf user survey was carried out with funding from Texas Sea Grant.
- Practically all Gulf observing system elements producing real time data streams have been integrated via the National Data Buoy Center.

Current Year Objectives:

- Obtain agreement on interim structure for GCOOS Regional Association and on preferred longer-term structure.
- Hold stakeholders' meeting to begin development of GCOOS Business Plan
- With assistance of Gulf Coast Sea Grant Programs and COSEEs, establish a GCOOS Education Council

Partners:

- Robert (Buzz) Martin, Texas General Land Office
- Landry Bernard, University of Southern Mississippi/National Data Buoy Center
- Vernon Asper, University of Southern Mississippi
- Frank Muller-Karger, University of South Florida
- Robert Stickney, Texas Sea Grant program

4) Great Lakes Observing System (GLOS)

Project Name/Title: Great Lakes Observing System (GLOS)

Date Project Initiated: October 2003

Recipient Institution: Great Lakes Commission

Primary Contact:

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Project Web Site: www.glc.org/glos/

Brief Project Summary: The Great Lakes Commission is leading initial development of the Great Lakes Observing System (GLOS), with funding through the NOAA Coastal Services Center. The GLOS is a regional node of the U.S. national Integrated Ocean Observing System (IOOS) initiative. The GLOS will provide access to information on the climate, meteorology, chemistry, geology, biology and human activities that affect the Great Lakes, their interconnecting waterways, the St. Lawrence River and the coastal environment. Data, information and knowledge about the system will be consolidated to meet the needs of resource managers, researchers, educators, commercial shippers, recreational boaters, beach users, spill responders and homeland security interests, among others.

The design of the GLOS will be a cooperative activity of many U.S. federal and state agencies with significant input from local agencies, academic institutions, nongovernmental organizations and industrial and commercial interests across the region. The development of the GLOS will be closely coordinated with Canadian federal agencies and provincial ministries.

Accomplishments to Date:

- Organized steering committee representing major interests to develop business plan
- Identified and engaged likely regional associates
- Coordinated planning with Canadian federal agencies and Ontario and Quebec ministries
- Developed project Web pages
- Conducted user needs assessments, including focus group discussions and presentations at various conferences and meetings
- Defined data and information subsystems and funding requirements
- Initiated consensus building on governance options for the regional association

Current Year Objectives: The objective of the first year of the initiative is to develop a consensus of international, federal, state, provincial, municipal, academic, institutional, nongovernmental, industrial and commercial interests for a sustainable business model for this effort and the regional association that will lead it. Each of the individuals engaged in developing this consensus represent major data sources, information managers and large user communities. The GLOS Regional Association is intended to be a vehicle for them to provide meaningful direction

and sustained support for the implementation and operation of an integrated observing system for the Great Lakes–St. Lawrence River system. The first year accomplishments are expected to lead to the formation of a formal regional association, with an independent board of directors in the second year, and to a pilot demonstration project involving data and information integration over a representative area of this highly complex system.

Primary Partners:

- International Joint Commission
- Great Lakes Fishery Commission
- Great Lakes Environmental Research Laboratory, NOAA
- U.S. National Weather Service, NOAA
- U.S. National Ocean Service, NOAA
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Michigan Department of Environmental Quality
- Great Lakes Sea Grant Network
- Great Lakes States Coastal Zone Management Programs
- Council of Great Lakes Research Managers
- The Ohio State University
- University of Minnesota
- University of Wisconsin
- Environment Canada

5) Mid Atlantic Research Association (MARA)

Project Name/Title: Mid Atlantic Research Association (MARA)

Date Project Initiated: June 2004

Recipient Institution: University of Delaware

Primary Contact:

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Project Web Site: To be established

Brief Project Summary: As a regional association, MARA will be responsible for the design and coordinated development of Regional Coastal Ocean Observing Systems (RCOOSs) in the Mid-Atlantic that are responsive to the needs of multiple user groups and improve as new knowledge

and technologies become available. Although MARA has its roots extending back to the NorthEast Observing System (NEOS), MARA is a new entity, with its purview extending from Cape Cod to Cape Hatteras. MARA will build an integrated observing system covering the watersheds, bays, estuaries, and open shelf waters of the Middle Atlantic Bight. Achieving success at this endeavor requires engagement between information producers and information users at the outset. For this reason, MARA has chosen to begin the process by assembling a team of key representatives from science, commerce, navigation, state coastal environmental management and protection, and homeland security communities whose charge it is to develop an organizational and governance structure. MARA is designed to focus on Integrated Ocean Observing System goals that directly support end user needs. It is a new structure, designed from the ground up with the users at the table.

Accomplishments to Date:

- Provisional Steering Committee established
- Workshop organized for late August to plan organization and governance structure
- Plan for five subregional workshops (based on 5 major ecosystems in the MARA footprint) in November 2004.
- Plan for comprehensive MARA organizational workshop in February 2005 addressing steps and timetable leading to MARA certification by Ocean.US.

Current Year Objectives:

- Establish the MARA organizational and governance structure
- Produce a MARA charter and strategic plan
- Seek funding for a MARA chief executive officer
- Develop a MARA business plan
- Plan regional pilot and demonstration projects

Partners:

- Co-Principals:
 - Dr. William Boicourt, University of Maryland
 - Dr. Scott Glenn, Rutgers University
- MARA membership will be officially determined following the workshop process outlined above.

6) Southern California Coastal Ocean Observing System (SCCOOS)

Project Name/Title: Organization and Outreach Structure for the Southern California Coastal Ocean Observing System (SCCOOS)

Date Project Initiated: March 25, 2004 (University of California advance approval to spend funds for directly related travel only; NOAA funds not yet received as of July 1, 2004).

Recipient Institution: Funds will be directed to the Joint Institute for Marine Observations (JIMO) at Scripps Institution of Oceanography; JIMO will then allocate funding to all subawardees.

Primary Contact:

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Project Web Site: sccoos.ucsd.edu or www.sccoos.org

Brief Project Summary: This project will provide the organizational framework for building capacity and partnerships among existing regional associations and agency end-users, and encouraging and enhancing collaboration among data collectors, data managers, and users of data and information. This will be accomplished through the establishment of an active user and provider working group network and the development of an organizational framework to support the successful management and operations of a Southern California Coastal Ocean Observing System (SCCOOS). The data provider and user work groups will be active participants in developing the governance, communication, implementation, data management, and product development structures that will support an operational SCCOOS. Implementation of this outreach and organizational development plan will link new and existing science, technology, and observational techniques with defined local and federal needs, and will enhance educational resources.

Accomplishments to Date: The coming fiscal year will mark the first year of funding for SCCOOS. Project leaders have begun to prepare job descriptions in anticipation of hiring an outreach coordinator when funds arrive, and have met with data providers at Scripps Institution of Oceanography and local county watershed management representatives in anticipation of determining personnel needs more specifically.

Current Year Objectives: In year one, the project will develop a regional network of issue-driven data user and provider working groups in the areas of water quality and coastal hazards, to include erosion, sediment transport, coastal ecology, and living marine resources. The groups will be tasked with defining management needs, building on existing collaborations, and articulating the benefits of such a system to science and society. The following tasks have been identified and remain year-one objectives:

1. Establish SCCOOS Outreach Implementation Team:
 - California Coastal Coalition
 - California Shore and Beach Preservation Association
 - Southern California Coastal Water Research Project
 - Southern California Wetlands Recovery Project
 - California Sea Grant
 - Southern California Coastal Ocean Observing System (SCCOOS)
2. Convene meeting of Implementation Team to design an outreach implementation strategy.
3. Develop and publish an official outreach implementation plan.
4. Identify stakeholders for Water Quality Data and Provider Working Group.
5. Identify stakeholders for Hazards Management and Shoreline Erosion Sediment Transport Data Provider User Group.
6. Identify stakeholders for Coastal Ecology and Living Marine Resources Data Provider User Group.
7. Develop subregional (county) key contacts for each working group issues area.

8. Design, organize, and convene a series of five subregional data and provider user group workshops to be held in San Diego County, Orange County, Los Angeles County, Santa Barbara County, and Ventura County.
9. Produce draft document of results of each workshop.

Partners: Consortium members include the California Polytechnic State University, San Luis Obispo (CalPoly), the University of California campuses at Santa Barbara (UCSB), Los Angeles (UCLA), and Irvine (UCI), the Jet Propulsion Laboratory, University of Southern California, Cal State Los Angeles, the Southern California Coastal Water Research Project (SCCWRP), Scripps Institution of Oceanography, the Universidad Autonoma Baja California (UABC), and Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE).

7) Southeast Coastal Ocean Observations Regional Association (SECOORA)

Project Name/Title: Southeast Coastal Ocean Observations Regional Association (SECOORA): Building a Regional Association Framework for the Coastal Ocean Observing System of the Southeastern United States

Date Project Initiated: October 2003

Recipient Institution: South Carolina Sea Grant Consortium

Primary Contact:

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Project Web Site: www.secoora.org

Brief Project Summary:

The overall goal of this project is to develop a functional and cost-effective governance mechanism—SECOORA—to ensure that coastal ocean observing system efforts in the southeastern U.S. are well coordinated, science based, stakeholder driven, linked to the national backbone, and sustained for the future. This project provides for a two-way exchange of information among a broad range of regional data providers (e.g., observation and monitoring programs, modeling groups), and between data providers and targeted stakeholders to ensure continuous input and feedback from and with user groups. Year one of this effort is focused on

cultivating the interest and support of a broad base of stakeholders in conceptualizing and designing the initial organization of the regional association. The year one goal is to form a provisional regional association with a signed charter to carry the association forward. Years two and three of this project will focus on strengthening SECOORA by further integrating Coastal Ocean Observing System (COOS) elements and additional stakeholders, and developing and implementing full operational capabilities.

Accomplishments to Date:

- Hired program coordinator, Sandy Eslinger.
- Established initial project team/advisory group for planning efforts.
- Conducted series of one-on-one and small-focus-group stakeholder and user interviews.
- Participated in Integrated Ocean Observing System (IOOS) industry workshop.
- Developed project Web site.
- Developed and coordinated initial recommended priorities for national backbone enhancements.
- Developed informational materials for stakeholders.
- Conducted a pre-organizational workshop consisting of observation system providers and various stakeholder groups to develop regional priorities and establish a strategy for addressing association governance.

Current Year Objectives:

1. Undertake a review of existing organizational models for regional governance, both within and outside the marine science arena, and identify features and functions of those models that could provide the elements essential to the development of SECOORA.
2. Identify and document public and private organizations and associations, business, industries, universities, laboratories, and agencies of government with involvement or interest in generating or using data and information from observing systems in the southeastern U.S. coastal ocean.
3. Contact and brief representatives of the organizations identified in Objective 2 on the current status of coastal ocean observing system efforts in the southeastern U.S. and gauge their interest in participating in the formation of SECOORA.
4. Maintain and augment an active dialogue with representatives of Ocean.US and adjacent regional associations through the National Federation of Regional Associations (NFRA) to ensure that SECOORA protocols for governance, information management and delivery, and administration are consistent with those being established at the national and regional levels.
5. Plan and convene a pre-organizational workshop involving representatives from the organizations identified in Objective 3 to discuss and reach consensus on the most appropriate organizational, management, governance, and operational elements for formalizing SECOORA.
6. Plan and convene an organizational “summit” to form a provisional regional association with a signed charter to carry the development of SECOORA forward.

Partners:

Partner Entities and Organizations:

Southeast Atlantic Coastal Ocean Observing System (SEA-COOS)
South Atlantic Bight Synoptic Offshore Observational Network (SABSOON)
Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)
Coastal Ocean Research and Monitoring Program (CORMP)

Neuse River Remote Monitoring and Data Acquisition Project
FerryMon
West Florida Coastal Ocean Monitoring and Prediction System (COMPS)
Physical Oceanographic Real-Time System (PORTS)
SEAKEYS/C-MAN Project
East Florida Shelf Information System (EFSIS) & Explorer of the Seas
South Florida Ocean Measurement Center
Florida Inshore Marine Monitoring and Assessment Program (IMAP)
National Estuarine Research Reserve System (NERRS)
Florida Department of Environmental Protection
U.S. Army Corps of Engineers (USACOE) Field Research Facility Data Program
Institute for Marine Remote Sensing (IMaRS)
South Carolina Estuarine and Coastal Assessment Program
Gray's Reef National Marine Sanctuary
U.S. Geological Survey (USGS) Center for Coastal and Watershed Studies
USGS Water Resources Division
Sebastian Inlet Observations
Florida Keys National Marine Sanctuary
NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML)
Coastal and Oceanographic Engineering Program
Guana Tolomoto Matanzas National Estuarine Research Reserve
Southeast Regional Climate Center
Hurricane Research Division, NOAA AOML
Florida Department of Environmental Protection
Coast Guard Marine Safety
Florida Fish and Wildlife Conservation Commission
North Carolina Department of Environment and Natural Resources
Georgia Department of Natural Resources
South Carolina Ocean and Coastal Resource Management
Florida Department of Environmental Protection
Florida Department of Health
Science Applications International Corporation
The Weather Channel
Applied Science Associates, Inc.
Harris Maritime Communications Service
Southeastern Universities Research Association
Southern Association of Marine Laboratories
South Atlantic Fisheries Management Council
NOAA Southeast Fisheries Science Center
Clemson University College of Engineering and Science
South Carolina Department of Natural Resources Marine Research Institute
Florida Department of Health
Southeast Center for Ocean Sciences Education Excellence (COSEE)
Florida COSEE
North Carolina Sea Grant
South Carolina Sea Grant Consortium
Georgia Sea Grant
Florida Sea Grant

Initial Project Team:

M. Richard DeVoe

South Carolina Sea Grant Consortium Director

Sandy Eslinger	SECOORA Program Coordinator
Robert H. Bacon	Sea Grant Extension Leader, South Carolina
James (Jim) C. Cato, Ph.D.	Sea Grant Director, Florida
Madilyn Fletcher, Ph.D.	Program Manager, Caro-COOPS
Keith W. Gates	Sea Grant Extension Director, Georgia
Richard A. Jahnke, Ph.D.	Member, Oceans.US Workshop Steering Committee
Mark E. Luther, Ph.D.	Member, U.S. Global Ocean Observing System Steering Committee
Christopher N. K. Mooers, Ph.D.	Program Manager, SEFCOE
James R. Nelson, Ph.D.	Co-PI, SABSOON
Harvey E. Seim, Ph.D.	Program Investigator, SEA-COOS
Michael S. Spranger, Ph.D.	Sea Grant Extension Director, Florida
John F. (Jack) Thigpen, III, Ph.D.	Sea Grant Extension Director, North Carolina
Elizabeth B. Waters	Professional Facilitator
Robert H. Weisberg	Principle, COMPS

8) Northwest Association of Networked Ocean Observing Systems (NANOOS)

Project Name/Title: Building Regional Association Partnerships in the Northwest: A Proposal to Continue Ongoing Efforts

Date Project Initiated: January 2004

Recipient Institution: University of Washington

Primary Contact:

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Project Web site: <http://www.nanoos.org/>

Brief Project Summary: The goal of this project is to foster and enhance Pacific Northwest Regional Partnerships to grow constituencies that will allow for the eventual installation and long-term maintenance of a Pacific Northwest Regional IOOS. We proposed to foster the development of strong Regional Association partnerships through proactively engaging, educating and entraining stakeholders throughout the Pacific Northwest in the benefits of an integrated regional ocean observing system.

Accomplishments to Date:

- Workshop I: Held the “Pacific Northwest Regional Ocean Observing System Workshop” on 23-24 October 2003 at Portland State University, OR. At the conclusion of the workshop a charter was signed by over 30 people creating the Northwest Association of

Networked Ocean Observing Systems (NANOOS) and appointing the above five individuals as the NANOOS Interim Steering Committee.

- Outreach: Numerous outreach talks/briefings given by Interim Steering Committee to several and diverse audiences (elaborated below).
- Pilot Project: Submitted two complementary pilots for NANOOS; one was funded: “A Pilot Coastal Ocean Observatory for the Estuaries and Shores of Oregon and Washington” (A. Baptista, PI) to focus on regional integration and expansion of existing but disparate observation and modeling capabilities for the estuaries and shores of Oregon (OR) and Washington (WA).
- Workshop II: Held the “NANOOS Governance Structure and Observing Priorities Workshop” on 5-7 May 2004, Oregon H&S Univ. Beaverton, OR. Specific output was general consensus on governance structure (501-c3) and other design characteristics, as well as prioritized lists for observing capabilities in both the National Backbone and for NANOOS.

Current Year Objectives:

- **Identify the full spectrum of stakeholders** having significant interests in the waters of the Pacific Northwest to ensure their views and opinions are fully recognized and taken into account, and that this partnership building effort takes advantage of their scientific, economic, social, cultural and operational expertise.
- **Proactively engage the regional ocean science community** in this partnership-building project to ensure their expertise helps guide the eventual design and evaluation of the system. This approach will ensure the PNW Regional IOOS evolves to take advantage of new knowledge and technology as they are developed.
- **Obtain input about sub-regional scale oceanographic concerns** by engaging with local stakeholders in advance of a major Regional Workshop and to ensure these factors are addressed at the Regional level. NANOOS will work within these smaller groups to build a sense of community and partnerships at the sub-regional scale and then translate this into strong regional partnerships through larger gatherings and workshops.
- **Obtain consensus agreement on the overall process to define a Governance structure** for a Pacific Northwest Regional Association based on the partnerships developed in this project.
- **Build international and inter-Region partnerships** by engaging with Canadian colleagues and other western Regional Association efforts to build bridges to these efforts and ensure seamless integration of these efforts.

To achieve these objectives, NANOOS will proceed with two major efforts over the next two months:

NANOOS coordinator: First, and most importantly, NANOOS wants to hire a coordinator whose focus will be to work on enhancing the partnerships and planning efforts that have been started by the five co-principle investigators. Second year funding from NOAA will allow for hiring the full-time coordinator with the intent of substantially accelerating the NANOOS efforts.

Third NANOOS Workshop on scientific system design: The second major effort in the near term will be to hold the third Workshop focusing on the scientific system design of the Pacific Northwest Regional Coastal Ocean Observing System (RCOOS) that NANOOS will eventually manage. This highly technical Workshop will continue the process of obtaining user group buy-in to planning that began in the first Workshop and highlighted in the second Workshop. NANOOS is committed to continuing the open, inclusive process used at our Workshops to

obtain the widest consensus possible from the various ocean community stakeholders in the Pacific Northwest.

Partners:

- University of Washington
- Oregon State University
- Oregon Health and Science University

Regional Pilot Projects

1) Gulf of Maine Ocean Observing System (GoMOOS) Marine Resource Management Pilot Project (*this project was funded in FY03, but all project work is being conducted in FY04*)

Project Name/Title: A Regional Association Project to Observe Ocean Climate in the Gulf of Maine in Support of Marine Resource Management: A Sentinel Buoy in the Northeast Channel with Predictive Tools for Shrimp Stocks and Marine Mammals

Date Project Initiated: October 1, 2003

Recipient Institution: Gulf of Maine Ocean Observing System (GoMOOS)

Primary Contact:

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Project Web Site: www.gomoos.org

Brief Project Summary: The Gulf of Maine Ocean Observing System (GoMOOS) has three fundamental and interconnected goals in carrying out this project:

1. To create a new suite of information products supporting fisheries management and adaptive management practices in the Gulf of Maine;
2. To augment existing ocean observing activities—GoMOOS buoys and NOAA National Marine Fisheries Service (NMFS) surveys—with a critically located climate sentinel buoy in the Northeast Channel; and
3. To implement a real-time distributed information network that will leverage and coordinate existing ocean observing activities at GoMOOS and NOAA NMFS.

GoMOOS will accomplish these goals by extending its existing partnerships to include scientists at National Marine Fisheries Service Northeast Fisheries Science Center, University of New Hampshire, and Cornell University. The information network will apply new OpenGIS

Consortium (OGC)-compliant Web protocols to extend spatial coverage of new products from the Gulf of Maine to Cape Hatteras.

Marine resource managers in the Gulf of Maine, and the fishermen whose livelihoods they affect, stand to benefit from the coordinated ocean observing, information product development, and distributed data and information management activities proposed in this project.

This project will also serve the IOOS community by demonstrating a coordinated data-exchange activity that can be implemented in other regions and will demonstrate the power of geographic information systems (GIS) in creating useful information products.

Accomplishments to Date:

- GoMOOS successfully deployed a deep-water mooring in the North East Channel in June 2004 and has been relaying hourly information to the public, free-of-charge, through the GoMOOS website Web site.
- Dr. Jeffrey Runge at the University of New Hampshire is working with Dr. Ann Richards at the North East Fisheries Science Center to identify environmental factors relating to shrimp recruitment, including a search of historical data. To date he has compiled an extensive record of monthly temperature and wind series data by depth for the past 20 to 30 years and historical shrimp data from NMFS in the Gulf of Maine and from the Canadian Department of Fisheries and Oceans on the Gulf of St. Lawrence.
- Dr. Andrew Pershing at Cornell University is analyzing data to modify models to predict slope water type from the North Atlantic Oscillation, *Calanus* sp. abundance from slope water, and the Northern Right Whale calving from *Calanus* to use data from the Northeast Channel mooring. He is completing a reanalysis of his original models using four more years of data. His preliminary findings indicate that his original conclusions are holding up. They are now engaged in an analysis of historical data from mooring location to recalibrate the models to the new data source.
- GoMOOS is now hosting the Gulf of Maine Ocean Data Partnership to bring together the data providers in the region to resolve the technical and institutional issues related to the dynamic sharing of data. Dr. David Mountain of NMFS is the president of the partnership, and GoMOOS is supporting the development of a work plan to help resolve issues such as serving data outside agency firewalls. The GoMOOS staff has been working closely with staff members at NMFS on this issue.
- The North East Channel buoy data is data are now reporting hourly on the GoMOOS website Web site. Additional data products on the website Web site are anticipated once the analysis of the correlation between the North Atlantic Oscillation and its affect on slope water, shrimp, *Calanus*, and right whales is complete.

Current Year Objectives:

- Northeast Channel Sentinel Buoy Deployment
- Information-Product Development
 - *Develop predictive indices relevant to fisheries management from existing research projects*
 - *Develop algorithms to compute predictive indices or reasonable proxies, from buoy data*
 - *Incorporate the predictive algorithms into the data management system*
 - *Develop “the story” that will go along with the data and information*
 - *Integrate these products into the Shrimp Project and other aspects of the Web site*

- Distributed Data Management and Visualization
 - Augment the OPeNDAP data sharing capacity at Northeast Fisheries Science Center
 - Develop hydrographic data products into GIS Format
 - Implement an OpenGIS-compliant data serving capacity
 - Implement the data-aggregation and visualization capability at GoMOOS

Partners: University of Maine, University of New Hampshire, Cornell University, and NOAA National Marine Fisheries Service.

2) Coastal Ocean Observatory for the Pacific Northwest

Project Name/Title: A Pilot Coastal Ocean Observatory for the Estuaries and Shores of Oregon and Washington

Date Project Initiated: July 2004

Recipient Institution: Oregon Health & Science University

Primary Contact:

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Project Web Site: www.ccalmr.ogi.edu/NANOOSpilot/

Brief Project Summary: As a step toward an operational coastal ocean observatory for the Pacific Northwest, this project proposes the integration and expansion of existing but disparate observation and modeling capabilities for the estuaries and shores of Oregon and Washington. In particular, the project will explore issues of governance and coordination, certification and quality control, maintenance, expandability, and data dissemination. Observations will concentrate on five estuaries (South Slough, Columbia River, Willapa Bay, Grays Harbor, and Puget Sound) and on two littoral cells (Columbia River and Rockaway). Modeling will extend to the entire Pacific Northwest. Information systems will aim at providing quantifiably reliable information to the right user, at the right time, in the right format, with initial focus on products needed to address: (a) estuarine water quality; (b) estuarine ecosystem management and restoration; and (c) coastal storms and erosion.

Accomplishments to Date: Fiscal year 2004 will mark the first year of funding for this project

Current Year Objectives:

- Engage coastal communities.
- Begin integration of existing subcomponent observatories.

- Acquire and install equipment to fill gaps in existing observatories.
- Create a regional modeling framework.
- Begin routine electronic distribution of Northwest Association of Networked Ocean Observing Systems (NANOOS)-branded data and products.

Partners: Oregon Health & Science University, Oregon Department of Geology and Mineral Industries, Oregon State University, South Slough National Estuarine Research Reserve, U.S. Geological Survey, University of Washington, and Washington Department of Ecology.

3) West Florida Coastal Observing Systems

Project Name/Title: A Pilot Project for Integration of the West Florida Coastal Observing Systems

Date Project Initiated: July 1, 2004

Recipient Institution: Florida Institute of Oceanography, University of South Florida

Primary Contact:

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Alternate Contact:

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Project Web Site: None established as yet

Brief Project Summary: The Everglades National Park maintains 33 stations in Florida Bay and adjacent Gulf Coast estuaries that record depth, specific conductance (salinity), and temperature at all stations and rainfall at all but 2 stations. The data from these stations are relayed daily to park headquarters via radio telemetry. Due to changes in transmission regulations, this will no longer be possible. Additionally, the data are not available to the general public in near real-time and cannot be integrated with other monitoring networks in regions such as the Coastal Ocean Monitoring and Prediction System (COMPS) along the west coast of Florida and the SEAKEYS network in the Florida Keys National Marine Sanctuary. The objective of this program is to equip 25 of the 33 stations with satellite transmitters to have the data available in near real-time. The data will be posted hourly on the COMPS Web site and made available to researchers, managers, and the general public.

Accomplishments to Date: Funding will not start until July 2004.

Current Year Objectives: Refit 25 of the Everglades National Park Marine Monitoring Network stations with satellite transmitters to allow for real-time data acquisition.

Partners:

SEAKEYS, Florida Institute of Oceanography

Coastal Ocean Monitoring and Prediction System, University of South Florida

Everglades National Park

Institute for Marine Remote Sensing, University of South Florida